

REMARKS

Reconsideration and allowance of this application are respectfully requested. Claims 22-32, 35 and 38 are cancelled, claims 39-41 are added, and claims 1-21, 33-34 and 36-37 remain in this application as amended herein. Accordingly, claims 1-21, 33-34, 36-37 and 39-41 are submitted for the Examiner's reconsideration.

Claims 5, 11 and 16 have been amended solely to provide proper antecedence. No new matter has been added by these amendments.

In the Office Action, claims 4-6, 10-12 and 16-18 were rejected under 35 U.S.C. § 112, second paragraph. The Examiner asserted that claim 4 recites an "ideal straight line" and further recites the "line part is curved", and the Examiner concluded that "[i]t is not clear how any approximation can be made while the ideal line is straight and curved at the same time." The Examiner also rejected claims 10 and 16 for similar reasons. Claims 4, 10 and 16 have been amended to overcome the Examiner's asserted informalities as suggested by the Examiner during a telephone conference held on February 3, 2005.

Further, the definiteness of the language of a claim is determined by whether the scope of the claim is clear to a person possessing the ordinary level of skill in the pertinent art. See M.P.E.P. §§ 2171 and 2173.02. Though claim 4, e.g., recites "the area of the occupied portion of the pixel being based on an area occupied by a portion of the visually important line part that passes through the pixel *when* the visually important line part is a straight line" and further recites that the area of the occupied portion of the pixel is "based on an area occupied by an ideal straight line segment which approximates the portion of the visually important line part

when the visually important line part is curved" (emphasis added), a person of ordinary skill in the relevant art would readily understand that the term "when" indicates that *in the event that* the visually important line part is a straight line, the area of the occupied portion of the pixel is defined in the first manner described above, and *in the event that* the visually important line part is curved, the area of the occupied portion of the pixel is defined in the second manner described above. The ordinary practitioner would never interpret the language of the claim as indicating that the above two conditions could be met at the same time, namely, the ordinary practitioner would never view the claim as indicating that the visually important line part can be both straight and curved at the same time.

It is therefore submitted that claims 4-6, 10-12 and 16-18 are in full compliance with the requirements of 35 U.S.C. § 112, second paragraph.

Regarding the art rejections, the Examiner rejected claims 1, 3-7, 9-13, 15-20, 30-31 and 33-38 under 35 U.S.C. § 102(e) as being anticipated by Naoi (U.S. Patent No. 6,683,617). Claims 30-31 are cancelled, and claims 1, 7, 13, 19-20, 33 and 36 have been amended to include limitations previously set out in claims 30 and 31. It is submitted that the claims are patentably distinguishable over Naoi.

Conventional image rendering systems perform antialiasing of *each of the pixels* in an image which requires the system to have a large memory capacity and a high-speed processing capability to display a dynamic image. The added memory and processing needs require the image rendering system to have large capacity, high-speed buffers which increase the cost and size of the system.

The present invention addresses this problem by determining that a given line part of an object depicted in the three-dimensional image is a visually important line part, extracting data representing the visually important line part from data representing the three-dimensional image, antialiasing *only the data representing the visually important line part* to form an antialiased image portion associated with the visually important line part, and then overwriting *only the antialiased image portion* onto a corresponding portion of the rendered image. Because the antialiasing is limited to the data representing the visually important line part, rather than being carried out over the entire image, the large capacity, high-speed buffers of the conventional image rendering systems are not needed and the cost and size of the system is reduced.

The antialiasing method and apparatus of the Naoi patent suffers from the drawbacks of the conventional systems in that *each pixel of the image* is processed during antialiasing. Specifically, Naoi describes that (i) a respective list of the polygons lying on a given scanning line is created for *each of the scanning lines* on a display screen, and (ii) hidden surface processing is then carried out for *each pixel of each of the polygons*. (See col. 3, lines 55-65; col. 4, lines 13-23; and col. 5, lines 41-66).

The Examiner contends that Naoi teaches an extracting means for extracting data representing a visually important portion of an object depicted in a three-dimensional image from data representing the three-dimensional image, and the Examiner refers to col. 5, lines 40-55 and col. 6, lines 4-9 and 24-30 of the patent. Naoi, however, merely describes that after the polygons lying *on a given scanning line of a display screen* are stored, the right and left edges and the z-coordinate values of

the sorted polygons of *the given scanning line* are fetched. The patent differs from the claimed extracting means in that: (I) Naoi describes using *the entire scanning line*. Naoi does not disclose or suggest using a *given line part*. (II) Naoi uses a scanning line of a *display screen* and does not disclose or suggest using a line part of a *depicted object*. In fact, the scanning line may include the line parts of several objects. (III) The scanning line is part of a *two-dimensional* image. Naoi does not disclose or suggest using a line part of an object depicted in a *three-dimensional* image. (IV) Naoi neither discloses nor suggests that a determination is made as to whether the scanning line or any part of the scanning line is *visually important*. (V) Naoi describes that the right and left edges and the z-coordinate values of the polygons are fetched for *every polygon* in the scanning line regardless of whether the polygon includes a visually important line part. The patent is not concerned with, and thus does not disclose or suggest, *extracting data representing the visually important line part*.

Therefore, Naoi does not disclose or suggest:

extracting means for determining that a given line part of an object depicted in a three-dimensional image is a visually important line part and for extracting data representing the visually important line part from data representing the three-dimensional image

as called for in claim 1.

The Examiner also asserts that Naoi teaches forming an antialiased image portion of the predetermined line part of the depicted object by antialiasing the extracted data. However, as described above, Naoi discloses antialiasing by processing every *pixel* of every *scanning line* of the display screen. The patent does not disclose or suggest antialiasing *only* the extracted data, i.e., antialiasing only the data representing *the visually*

important line part, to form an antialiased image portion associated with *the visually important line part*.

The Examiner also refers to Figs. 12-13 of the reference. However, Fig. 13 merely shows the image of Fig. 12 after the image is antialiased in the manner described by Naoi, namely, after *every pixel* of *every scanning line* of the image is processed. (See col. 11, lines 36-40). Further, the Examiner refers to the abstract of the disclosure. However, the abstract merely describes that display colors are determined *on a pixel-by-pixel basis* using subpixel masks indicative of a region which a polygon occupies within a pixel and color data. The abstract does not disclose or suggest that the pixel data represents a *visually important line part*. Additionally, the Examiner refers to col. 11, lines 40-50 of Naoi. However, the cited portion of the description merely indicates that the antialiasing is subpixel based and does not disclose or suggest that antialiasing is restricted to *only data* representing a visually important line part.

Naoi thus does not disclose or suggest:

antialiasing means for antialiasing only the
extracted data to form an antialiased image portion
associated with the visually important line part

as defined in claim 1.

The Examiner also contends that Naoi teaches overwriting only the antialiased image portion onto a corresponding portion of the rendered image and refers to Fig. 7, block 105 as well as the previously noted Figs. 12-13 and col. 11, lines 35-40. However, Naoi merely shows an integration-selection circuit in Fig. 7 which, for a given pixel, (i) integrates and compares color data and subpixel masks generated by color combining circuits and mask combining

circuits and (ii) selects four sets of color data and subpixel masks that are then fed to respective color buffers and mask buffers. The steps are repeated until final color data and subpixel mask sets are generated and are used to determine the final color of that pixel. (See also Fig. 10; col. 10, lines 8-14; and col. 11, lines 1-22.) As noted above, Naoi describes that antialiasing processing is carried out for every pixel of every scanning line of the display screen, and thus final color data and subpixel mask sets are determined for every pixel of the display screen. For example, the antialiased image shown in the cited Fig. 13 is formed using final color data and subpixel mask sets that are determined for every pixel of the image shown in Fig. 12. The patent therefore describes overwriting the entire display screen and does not disclose or suggest overwriting only the antialiased image portion, namely, overwriting only the image portion formed by antialiasing only the extracted data representing the visually important line part, onto a corresponding portion of the rendered image.

Naoi does not disclose or suggest:

overwriting means for overwriting only the antialiased image portion onto a corresponding portion of the rendered image

as set out in claim 1.

It follows that Naoi neither discloses nor suggests the image rendering apparatus defined in claim 1 and does not anticipate the claim.

Claims 3-6 depend from claim 1, and each claim further defines and limits the invention set out in the independent claim. It follows that each of claims 3-6 defines a combination that is patentably distinguishable over Naoi for at least the same reasons.

Independent claim 7 is directed to an image rendering method that includes:

determining that a given line part of an object depicted in a three-dimensional image is a visually important line part; [and]
extracting data representing the visually important line part from data representing the three-dimensional image;

and further includes:

antialiasing only the extracted data to form an antialiased image portion associated with the visually important line part; and
overwriting only the antialiased image portion onto a corresponding portion of the rendered image.

It follows that claim 7 is patentably distinguishable over the Naoi patent at least for the reasons set out above regarding claim 1.

Claims 9-12 depend from claim 7 and are therefore each distinguishable over the cited reference for at least the same reasons.

Independent claim 13 is directed to a computer-readable storage medium having a computer program stored therein for operating an apparatus to perform the image rendering method defined in claim 7. Claim 13 is therefore patentably distinguishable over Naoi for at least the same reasons.

Claims 15-18 depend from claim 13 and are distinguishable over the cited art at least for the same reasons.

Independent claim 19 relates to a server apparatus that includes a computer-readable storage medium similar to that defined in claim 13. Therefore, at least for the same reasons, claim 19 is patentably distinguishable over the Naoi reference.

Claim 20 defines a computer-readable storage medium having limitations similar to those set out in claim 13 and is patentably distinguishable over Naoi at least for the same reasons.

Independent claim 33 calls for an image rendering apparatus having limitations similar to those set out in claim 1. Claim 33 is therefore patentably distinguishable over the Naoi patent at least for the same reasons.

Claim 34 depends from claim 33 and is distinguishable over the cited reference for at least the same reasons.

Additionally, claim 33 recites that the visually important line part includes a contour of the depicted object or a contour candidate of the depicted object. As acknowledged by the Examiner on page 6 of the Office Action, Naoi neither discloses nor suggests such a limitation.

Independent claim 36 defines an image rendering method having limitations similar to those set out in claim 7. It follows that claim 36 is patentably distinguishable over the Naoi patent at least for the same reasons.

Claim 37 depends from claim 36 and is distinguishable over Naoi for at least the same reasons. Further, claim 37 includes limitations similar to those set out in claim 34 and is further distinguishable over the cited reference for at least the same reasons.

Accordingly, the withdrawal of the rejection under 35 U.S.C. §102 is respectfully requested.

The Examiner also rejected claim 2, 8, 14, 21, 29 and 32 under 35 U.S.C. § 103(a) as being unpatentable over Naoi in view of Kaasila (U.S. Patent No. 6,437,793). Claims 29 and 32 are cancelled. It is submitted that the remaining claims are patentably distinguishable over the references.

Claim 2 depends from claim 1, claim 8 depends from claim 7, claim 14 depends from claim 13, and claim 21 depends from claim 20. Therefore, each of claims 2, 8, 14 and 21 are distinguishable over the Naoi patent at least for the same reasons described above regarding their parent claims.

The Examiner acknowledges that Naoi does not disclose or suggest the limitations called for in claims 2, 8, 14 and 21 but contends that Kaasila does. The Kaasila patent, however, merely describes the antialiasing of shapes by *assigning a coverage value* to each pixel that is partially covered by the shape. (See col. 1, line 63 - col. 2, line 1; col. 2, lines 41-63; col. 3, lines 16-25 and 42-50 and col. 23, lines 28-32). The pixel coverage values are determined by scanning multiple horizontal and vertical sampling lines across the object to *determine the intersections* between each sampling line and the outlines of the character, and then *the sampling data* is used to *calculate the coverage value*. (See col. 11, lines 38-55; col. 12, lines 45-57; and col. 16, lines 23-28). As an example, Fig. 41 shows the outline of a letter in which the coverage values are determined in this manner. The patent does not disclose or suggest *extracting data* representing the outline of the letter *from data representing the image*. Therefore, Kaasila does not remedy the deficiencies of Naoi as described above regarding claims 1, 7, 13 and 20.

Accordingly, the withdrawal of the rejection under 35 U.S.C. § 103 is respectfully requested.

New claim 39 depends from claim 20, new claim 40 depends from claim 33, and new claim 41 depends from claim 36. Therefore, each of claims 39-41 are distinguishable over the cited art at least for the same reasons. Also, claim 39 includes limitations similar to those set out in claim 15, claim

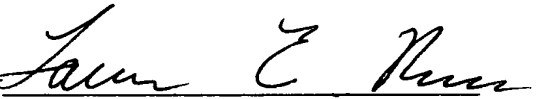
40 includes limitations similar to those set out in claim 3 and claim 41 includes limitations similar to those set out in claim 9. Therefore, each of claims 39-41 are similarly supported.

As it is believed that all of the rejections set forth in the Official Action have been fully met, favorable reconsideration and allowance are earnestly solicited. If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that the Examiner telephone Applicant's attorney at (908) 654-5000 in order to overcome any additional objections which the Examiner might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

Dated: February 24, 2005

Respectfully submitted,

By 

Lawrence E. Russ

Registration No.: 35,342

LERNER, DAVID, LITTENBERG,

KRUMHOLZ & MENTLIK, LLP

600 South Avenue West

Westfield, New Jersey 07090

(908) 654-5000

Attorney for Applicant

541283_1.DOC